भारतीय मानक
Indian Standard

IS 17856 : 2022

झिल्ली के रूप में उपयोग के लिए वल्केनाइज्ड एकल परत रबर शीट्स — विशिष्टि

Vulcanized Single Layer Rubber Sheets for Use as Membrane — Specification

ICS 83.140.10

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March 2022 **Price Group 3**

Rubber and Rubber Products Sectional Committee, PCD 13

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Rubber and Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Rubber sheets are used for various applications across the world. Rubber sheets manufactured using specialty elastomers having specific performance attributes, such as weather resistance and barrier properties are used in applications of liners for ponds, canals, waterproofing, etc.

With changing time, the use and manufacturing of such products is becoming a necessity. While formulating this standard, considerable assistance has been derived from ASTM D 6134 Vulcanized Rubber Sheets Used in Waterproofing Systems.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

VULCANIZED SINGLE LAYER RUBBER SHEETS FOR USE AS MEMBRANE — SPECIFICATION

1 SCOPE

This Indian Standard covers vulcanized synthetic rubber sheets for use as a membrane for various applications like water storage, water seepage control, waterproofing solutions (waterproofing sheets), rubber linings of ponds/canals/reservoirs, retention basins, artificial streams in parks/gardens, etc.

2 REFERENCES

The following standards contain provisions which through, reference in this text constitute the provisions of the standards. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

IS No.	*Title*
3400 (Part 1) : 2021/ ISO 37: 2017	Methods of test for vulcanized rubber: Part 1 Determination of tensile stress-strain properties (*fourth revision*)
3400 (Part 2) : 2014/ ISO 48-2 : 2018	Methods of test for vulcanized rubber: Part 2 Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)
3400 (Part 4) : 2012/ ISO 188 : 2011	Methods of test for vulcanized rubber: Part 4 Accelerated ageing and heat resistance (*third revision*)
3400 (Part 6) : 2018/ ISO 1817 : 2015	Methods of test for vulcanized rubber: Part 6 Determination of the effect of liquids (*fourth revision*)
3400 (Part 12) : 2021/ ISO 34-1 : 2015	Methods of test for vulcanized rubbers: Part 12 Tear strength — Trouser, angle and crescent test piece (*first revision*) (*under print*)
3400 (Part 13) : 2021/ ISO 2285 : 2013	Methods of test for vulcanized rubbers: Part 13 Tension set (*second revision*)
3400 (Part 20) : 2018/ ISO 1431-1 : 2012	Methods of test for vulcanized rubbers: Part 20 Resistance to ozone cracking — Static strain test (*second revision*)
3400 (Part 25) : 2018/ ISO 812 : 2011	Methods of test vulcanized rubber: Part 25 Determination of low temperature brittleness
3708 (Part 9) : 2018/ ISO 247 : 2006	Methods of test for natural rubber latex: Part 9 Determination of total ash (*third revision*)
16078 : 2013/ ISO 12236 : 2006	Geosynthetics — Static puncture test (CBR test)

3 MATERIALS AND MANUFACTURE

3.1 The rubber sheet shall be formulated using appropriate elastomers with superior weather resistance and lower permeability characteristics. Examples of which are butyl rubber (IIR), ethylene propylene dieneterpolymer (EPDM) rubber and blends of the same and any other elastomer combinations capable of meeting the property limits defined in this Standard. The mass percentage of the principal polymer in relation to the total polymer shall be greater than 50 percent.

3.2 The rubber sheet shall be capable of being bonded to itself for making field splices, repairs and the manufacturer shall recommend the methods and materials for the same.

3.3 The rubber sheet shall be formed and vulcanized in the manufacturer unit by an appropriate method to meet standard specification.

4 WORKMANSHIP, FINISH AND APPEARANCE

4.1 On visual examination, the sheet shall be smooth, watertight and visually free from pinholes, foreign materials, undispersed raw materials or other manufacturing defects that might affect product performance during service. Visual defects like blister/air entrapment, pin hole is shown in Fig. 1 and Fig. 2.

4.2 Factory joints/seams shall be fully adhered across their entire widths.

5 REQUIREMENTS

5.1 Thickness of the rubber sheet shall be 1 to 1.5 mm when determined in accordance with **7.2** of IS 3400 (Part 1). Tolerance on thickness shall be ± 10 percent.

5.2 After ageing at 120 °C for 168 h as prescribed in IS 3400 (Part 4), the linear dimension change of the rubber sheet shall be within ± 2 percent.

5.3 Water vapor permeance may be tested as agreed between the purchase and the supplier.

5.4 Rubber sheet shall also comply with the requirements as given in Table 1 when tested as prescribed in col 4 of Table 1.

6 SAMPLING AND CRITERIA FOR CONFORMITY

The scale of sampling and criteria for conformity of a consignment of rubber sheets shall be in accordance with agreement between buyer and seller.

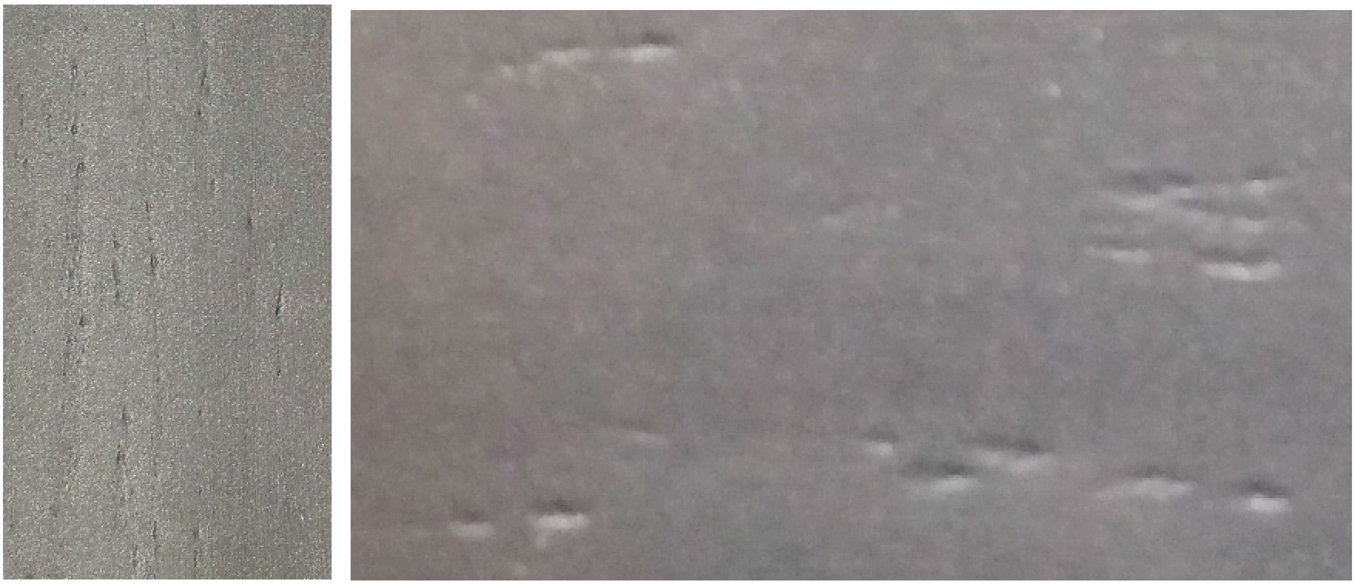

Fig. 1 (a) Fig. 1 (b)

Fig 1 Sample Picture of Visual Defect — Blisters/Air Entrapment

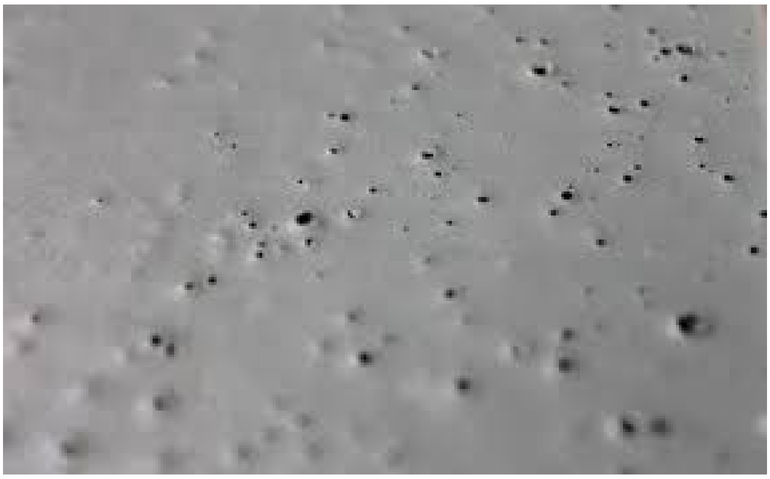

Fig. 2 Sample Picture of Visual Defect — Pin Hole

Table 1 Requirement for Vulcanized Single Layer Rubber Sheets for Use as Membrane

(*Clause* 5.4)

Sl No. (1)	**Characteristic** (2)	**Requirement** (3)	**Methods of Test Refer To,** (4)
i)	Ash content, weight percent, *Max*	35	IS 3708 (Part 9)
ii)	Hardness, IRHD	60 ± 10	IS 3400 (Part 2)
iii)	Tension set, percent, *Max*	10	IS 3400 (Part 13) **Test Condition:** Specimen – Type 1 dumb-bell-shaped; Elongation – 50 percent; Holding time – 10 min, 27 ± 2 °C
iv)	Tear resistance, kN/m, *Min*	26	IS 3400 (Part 12)
v)	Brittleness temperature, °C, *Max*	– 30	Procedure B of IS 3400 (Part 25)
vi)	Water absorption, percent in mass, *Max*	3	IS 3400 (Part 6) **Test Condition:** Duration of exposure – 7 days, 70 °C.
vii)	Factory joint strength, MPa, *Min*	6.5	IS 3400 (Part 1) **Test Condition:** 25 mm Joint width and 25mm × 115 mm rectangular strip specimen.
viii)	Ozone resistance (static)	No cracks on visual examination	IS 3400 (Part 20) **Test Condition:** Ozone concentration – 50 ± 5 pphm, Duration of exposure – 120 h, Test temperature – 40 ± 2 °C, Elongation – 50 ± 2 percent.
ix)	Puncture resistance, N, *Min*	250	IS 16078
x)	Tensile strength, MPa, *Min*	7.5	IS 3400 (Part 1) **Test Condition:** Specimen – Dumb-bell-shaped Type 1
xi)	Elongation at break, percent, *Min*	300	IS 3400 (Part 1) **Test Condition:** Specimen - Dumb-bell-shaped Type 1
xii)	Resistance to Heat ageing, aged values after 168 h at 120 °C as prescribed in IS 3400 (Part 4)		
	a) Tensile strength, MPa, *Min*	6.6	IS 3400 (Part 1) **Test Condition:** Specimen – Dumb-bell-shaped Type 1
	b) Elongation at break, percent, *Min*	200	IS 3400 (Part 1) **Test Condition:** Specimen – Dumb-bell-shaped Type 1

NOTE — The tests shall be performed on the finished product or sheet.

7 PACKING AND MARKING

7.1 Packing

7.1.1 The product shall be packed in suitable form of packing, as agreed to between the purchaser and the supplier.

7.1.2 In absence of a defined packing material, the product shall be appropriately packed in damage and contamination proof packing for example, LDPE laminated raffia bags/roll, etc. Single use plastics are not permitted to be used.

7.2 Marking

The product shall be marked with the following:

a) Name of the product;
b) Thickness;
c) Batch number;
d) Month and year of manufacture of the material;
e) Name of the manufacturer and trade mark, if any;
f) Safety instructions for proper handling, if required; and
g) Any other statutory requirements.

7.3 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and *the Rules and Regulations* framed thereunder, and the products may be marked with the Standard Mark.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Rubber and Rubber Products Sectional Committee, PCD 13

Organization	*Representative(s)*
The Rubber Board, Kottayam	Dr Siby Varghese (***Chairman***)
All India Rubber Industries Association, Mumbai	Shri Srikanth Krishnamurthy Shri Chinmoy Ray (*Alternate*)
Association of Planters of Kerala, Kerala	Shri Santosh Kumar Shri Philip C. Jacob (*Alternate*)
Automotive Tyres Manufacturers Association (ATMA), New Delhi	Shri Niteesh K. Shukla Shri Rajiv Budhraja (*Alternate*)
Block Rubber Processor's Association of India	Shri Rajiv Tharian Shri Ronny Joseph (*Alternate*)
Ministry of Defence (DGQA), New Delhi	Shri S. K. Saxena Shri V. K. Chhabra (*Alternate*)
Dow Corning India Pvt Ltd,	Shri Subhranshu Gupta
Flame Retardants Association of India, Gurugram	Shri P. V. Murali Mohan
GRP Limited, Mumbai	Shri Kalyan Das
HASETRI, Rajasthan	Shri Saikat Das Gupta
Indian Oil Corporation R and D Centre, Faridabad, Haryana	Dr Deepak Saxena Dr Pankaj Bhatnagar (*Alternate*)
Indian Rubber Manufacturers Research Association (IRMRA), Mumbai	Dr K. Rajkumar Dr Bharat Kapgate (*Alternate*)
Indian Synthetic Rubber Private Limited (ISRPL), Noida	Shri Lalit Kumar Sharma Shri Bhanu Pratap Singh (*Alternate*) Shri Tuhin Kanti Das (*Young Professional*)
KA Prevulcanized, Tamilnadu	Shri Praveen Mathew
LPG Equipment Research Centre, Bengaluru	Shri Naresh Gera Shri A. Krishna Kutty (*Alternate*)
LANXESS India Private Limited, Kolkata	Shri Aridaman Ghosh
MRF Tyres	Shri G. Shyju Ms P. Idumathi (*Alternate*)
Newage Fire Protection Industries Pvt Ltd	Shri Bharat J. Shah Shri Jayant Sinha (*Alternate*)
Rado Industries Limited, Faridabad	Shri Kailash Gupta
Reliance Industries Ltd (Elastomers Business), Vadodara	Dr Abhijit Adhikary Mr Shambhu Lal Agrawal (*Alternate*)
Research, Designs and Standards Organization, Lucknow	Shri Mnjesh Kumar Shri Ravi Prakash (*Alternate*)
Shri Sati Rubber Industries, Jaipur	Shri Vijay Kumar Agarwal Shri Sudhir Agarwal (*Alternate*)
Voluntary Organization in Interest of Consumer Education (VOICE), New Delhi	Shri M. A. U. Khan Shri H. Wadhwa (*Alternate*)
In Personal Capacity	Dr Arup K. Chandra

Organization	*Representative(s)*
In Personal Capacity	Dr Sunny Sebastian
In Personal capacity	Dr Ranjit Mathhan
BIS Directorate General, New Delhi	Shrimati Nagamani. T, Scientist 'E' and Head (PCD) [Representing Director General (*Ex-officio*)]

Member Secretary

Shri Vijay Kumar Gupta
Scientist 'D' (PCD), BIS

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